



The Army's Ground Combat Vehicle (GCV) and Early Infantry Brigade Combat Team (E-IBCT) Programs: Background and Issues for Congress

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Summary

In April 2009, Secretary of Defense Gates announced that he intended to significantly restructure the Army's Future Combat System (FCS) program. The FCS was a multiyear, multibillion dollar program that had been underway since 2000 and was at the heart of the Army's transformation efforts. In lieu of the cancelled FCS Manned Ground Vehicle (MGV), the Army was directed to develop a Ground Combat Vehicle (GCV) that would be relevant across the entire spectrum of Army operations and would incorporate combat lessons learned from Iraq and Afghanistan. As part of the FCS program, the Army had been "spinning out" selected FCS technologies to brigade combat teams (BCTs) that were deploying to Iraq and Afghanistan. Secretary Gates's April 2009 restructuring decision included provisions to continue these efforts, and the Army decided that initially these technologies would be provided to Infantry Brigade Combat Teams (IBCTs); the Army designated this effort as the Early Infantry Brigade Combat Team (E-IBCT) program.

The Army reissued a request for proposal (RFP) for the GCV on November 30, 2010, and plans to begin fielding the GCV by 2015-2017. The first E-IBCT capabilities package (Increment One), consisting of an unmanned aerial and ground vehicle, unattended sensors, and a network integration kit, was tested in September 2009 and demonstrated poor performance and reliability. Because of the test results, Increment One was judged not ready to field and the Army was required to repeat the limited users test in September 2010.

The Department of Defense's (DOD's) FY2011 Budget Request for the GCV was \$934.3 million for Research, Technology Development and Evaluation (RDT&E) and \$682.7 million for procurement. The E-IBCT's FY2011 budget request was for \$1.6 billion for RDT&E. The House Armed Services Committee (HASC) and Senate Armed Services Committee (SASC) initially recommended fully funding the GCV budget request, but the HASC expressed concerns that the original GCV requirements were too ambitious and urged the Army to take a more incremental approach, noting that the Army needed to conduct a more thorough analysis of alternatives prior to proceeding to the technology development phase. The Senate Committee on Appropriations Defense Subcommittee recommended providing only \$462.1 million, reflecting the likely six-month contract award delay due to the reissue of the RFP. The HASC, concerned about past performance issues with the E-IBCT, recommended cutting \$152.7 million in RDT&E and \$626.7 million in procurement funding from the FY2011 E-IBCT Increment One budget request. The SASC recommended \$302.4 million for E-IBCT procurement funding, and the Senate Committee on Appropriations Defense Subcommittee recommended a \$2 million reduction for the Class I unmanned aerial vehicle and a \$12 million reduction for E-IBCT training/logistics/management. Because the Senate did not consider H.R. 5136, the FY2011 National Defense Authorization Act, under normal legislative process, H.R. 6523 was agreed to by the House and Senate in lieu of H.R. 5136 and contains revised authorization language for both the GCV and E-IBCT program. H.R. 6523 became P.L. 111-383 on January 7, 2011.

There are two major force structure-related decisions that could affect these programs. The first is that the Army is considering returning to a division-based structure and adding a third maneuver battalion to heavy brigade combat teams (HBCTs) and IBCTs. Another issue is the impact of Secretary of Defense Robert Gates's January 6, 2011, decision to recommend cutting 27,000 active duty soldiers from the Army force structure, possibly resulting in fewer BCTs. Additionally, if the GCV and E-IBCT programs prove to be technologically infeasible or too costly, there are alternatives to both programs, primarily through improving current systems.

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Introduction

In April 2009, Secretary of Defense Robert Gates announced that he intended to significantly restructure the Army's Future Combat System (FCS) program. The Future Combat System (FCS) was a multiyear, multibillion dollar program that had been underway since 2000 and was at the heart of the Army's transformation efforts. It was to be the Army's major research, development, and acquisition program, consisting of 18 manned and unmanned systems tied together by an extensive communications and information network.

Secretary Gates also recommended cancelling the manned ground vehicle (MGV) component of the FCS program, which was intended to field eight separate tracked combat vehicle variants built on a common chassis that would eventually replace combat vehicles such as the M-1 Abrams tank, the M-2 Bradley infantry fighting vehicle, and the M-109 Paladin self-propelled artillery system. As part of this restructuring, the Army was directed to develop a Ground Combat Vehicle (GCV) that would be relevant across the entire spectrum of Army operations and would incorporate combat lessons learned in Iraq and Afghanistan.

As part of the FCS program the Army had been "spinning out" selected FCS technologies to brigade combat teams (BCTs) that were deploying to Iraq and Afghanistan. Secretary Gates's April 2009 restructuring decision included provisions to continue these efforts, and the Army decided that initially these technologies would be provided to Infantry Brigade Combat Teams (IBCTs); the Army designated this effort as the Early Infantry Brigade Combat Team (E-IBCT) program.

Congressional interest in these two programs has been significant, as both the GCV and E-IBCT programs directly impact 64 of the Army's 73 BCTs and could be expanded to other types of units if they prove successful. Given the Army's relatively poor track record of developing and fielding major combat systems over the past three decades, some analysts believe that the GCV program, in particular, could be the Army's last opportunity to prove that it should be in charge of developing and managing its own weapon systems programs.

Background

FCS Program and Spin Outs

Origins of the FCS. In October 1999, Chief of Staff of the Army (CSA) General Eric Shinseki introduced the Army's new transformation strategy to convert all of the Army's divisions (called Legacy Forces) into new organizations called the Objective Force. General Shinseki wanted to make the Army lighter, more modular, and—most importantly—more deployable. As part of this transformation, the Army adopted the Future Combat System (FCS) as a major acquisition program to equip the Objective Force.¹

¹ James Jay Carafano, "The Army Goes Rolling Along: New Service Transformation Agenda Suggests Promise and Problems," *Heritage Foundation*, February 23, 2004, p. 5.

This transformation, due to its complexity and uncertainty, was scheduled to take place over the course of three decades, with the first FCS-equipped unit becoming operational in 2011 and the entire force transformed by 2032. General Shinseki's vision for the FCS was that it would consist of smaller and lighter ground and air vehicles—manned, unmanned, and robotic—and would employ advanced offensive, defensive, and communications/information systems to outsmart and outmaneuver heavier enemy forces. In May 2000, four contracts were awarded to industry teams to develop FCS designs and in March 2002, the Army chose Boeing and Science Applications International Corporation (SAIC) to serve as the lead systems integrators to oversee certain aspects of the development of the FCS's 18 systems. The Army's objective was to field 15 FCS BCTs equipped with FCS MGVs and provide selected FCS communications, sensors, and unmanned vehicle technologies to all 43 of its IBCTs by FY2025.

FCS Program Criticisms. The FCS program was subject to a wide range of criticisms. First and foremost was the inability to agree on total program cost. In March 2006, the Government Accountability Office (GAO) estimated that the current total cost for the FCS program was \$160.7 billion (then-year dollars)—an increase of 76% over the Army's first estimate.² In July 2006, the Department of Defense's Cost Analysis Improvement Group (CAIG) estimated that the total cost for the development, procurement and operations of FCS had increased to more than \$300 billion.³ Throughout the FCS program, the Army maintained that the total cost for the FCS program would be roughly \$160 billion and the MGV component was to be the most expensive part of the overall program.

Other program criticisms were immaturity of program technologies and an overly ambitious timeline. In 2008 GAO testified that:

Today, the FCS program is about halfway through its development phase, yet it is, in many respects, a program closer to the beginning of development. This portends additional cost increases and delays as FCS begins what is traditionally the most expensive and problematic phase of development. In the key areas of defining and developing FCS capabilities, requirements definition is still fluid, critical technologies are immature, software development is in its early stages, the information network is still years from being demonstrated, and complementary programs are at risk for not meeting the FCS schedule. It is not yet clear if or when the information network that is at the heart of the FCS concept can be developed, built, and demonstrated. Yet, the time frame for completing FCS development is ambitious; even if all goes as planned, the program will not test production-representative prototypes or fully demonstrate the system of systems until after low rate production begins.⁴

MGV Criticisms.⁵ FCS MGVs were originally intended to be transportable by C-130 aircraft and, as such, the Army established a 20 ton weight limit for the vehicles. Prototype MGVs were from seven to nine tons over the 20 ton weight limit and, in order to not only make the weight

² Government Accountability Office (GAO) Report "Acquisitions: Business Case and Business Arrangements Key for Future Combat System's Success," GAO-06-478T, March 1, 2006, p. 8.

³ Megan Scully, "Army Sticks to its Guns, Rejects New FCS Cost Estimates," *National Journal's Congress Daily AM*, July 13, 2006.

⁴ Testimony Before the Subcommittee on Air and Land Forces, Committee on Armed Services, House of Representatives, "Defense Acquisitions: 2009 Review of Future Combat System is Critical to Program's Direction," April 10, 2008, p. 1.

⁵ Information in this section is taken from Stew Magnuson, "Future Combat Vehicles Will Fall Short of Preferred Weight," *National Defense*, June 2007 and Office of Management and Budget, "Terminations, Reductions, and Savings: Budget of the U.S. Government, Fiscal Year 2010," May 7, 2009.

limit but also so MGVs could fit on the aircraft, armor and other components would have to be removed and transported on other aircraft to be reassembled once the vehicle landed. Another criticism was that MGVs were to be overly reliant on a hit-avoidance system⁶ as well as an active protection system⁷ in lieu of traditional armor protection. The issue of the MGV's relevancy was also a point of contention. Some critics suggested that MGVs—even with modular armor—would be ill-suited in an improvised explosive device (IED) environment and that prototype designs failed to take into account lessons learned in developing and fielding the Mine-Resistant, Ambush Protected (MRAP) vehicle.⁸ Questions were also raised about how relevant the MGV would be in an irregular warfare⁹ environment that many defense analysts believe could characterize future conflicts.

Spin Outs

On June 26, 2008, primarily in response to both congressional and DOD concerns about getting FCS technologies to forces in the field sooner and overall program affordability, the Army restructured the FCS program. In an official press release, the Army announced the restructuring, characterizing it as an effort “to accelerate FCS deliveries to IBCTs.”¹⁰ The Army planned to field (referred to by the Army as spin outs) the following technologies to 43 IBCTs during the 2011 to 2025 time frame:¹¹

- Tactical and Urban Unattended Ground Sensors;
- Non-Line of Sight Launch System (NLOS-LS);
- Network Integration Kits for High Mobility, Multi-Wheeled Vehicles (HMMWV);
- Class I Unmanned Aerial Vehicles (UAVs); and
- Small Unmanned Ground Vehicles (SUGVs).

The Army conducted a Preliminary Limited User Test (P-LUT) focused on infantry units at Ft. Bliss, TX, in July 2008, and the Army hoped to spin out these technologies to IBCTs beginning in

⁶ A hit-avoidance system is intended to use a variety of sensors and information technologies to detect the presence of mines, IEDs, and enemy forces so that these threats can be avoided.

⁷ An active protection system is a vehicle-mounted system which is intended to first detect incoming enemy anti-tank or anti-vehicle missiles and/or grenades and then engage and destroy these threats by means of a kinetic device.

⁸ For additional information on MRAPs see CRS Report RS22707, *Mine-Resistant, Ambush-Protected (MRAP) Vehicles: Background and Issues for Congress*, by Andrew Feickert.

⁹ DOD Joint Publication 1-02, dated July 2010, defines Irregular Warfare as “a form of warfare that has as its objective the credibility and/or legitimacy of the relevant political authority with the goal of undermining or supporting that authority. Irregular warfare favors indirect approaches, though it may employ the full range of military and other capabilities to seek asymmetric approaches, in order to erode an adversary's power, influence, and will.”

¹⁰ U.S. Army News Release, “Army to Accelerate Future Combat Systems Deliveries (FCS) to Infantry Brigade Combat Teams,” Army Public Affairs Office, Washington D.C., June 26, 2008.

¹¹ Ann Roosevelt, “Army Tightens FCS Focus on Infantry and Current Fight,” *Defense Daily*, June 26, 2008; U.S. Army News Release, “Army to Accelerate Future Combat Systems Deliveries (FCS) to Infantry Brigade Combat Teams,” Army Public Affairs Office, Washington D.C., June 26, 2008; Daniel Wasserbly, “Bringing Soldiers Into the Network: Army to Align Ground Soldier Program with FCS Spin Out 1 Fielding,” *InsideDefense.com*, June 30, 2008; and a FCS Acceleration Briefing provided to CRS on July 21, 2008.

FY2011. IBCT Spin Out One equipment was planned to be fielded to both Active and National Guard IBCTs, based on when the units were scheduled to deploy to Iraq or Afghanistan.¹²

Secretary of Defense Gates's April 2009 FCS Restructuring Decision

On April 6, 2009, Secretary of Defense Gates announced that he intended to significantly restructure the FCS program.¹³ The Department of Defense planned to accelerate the spin out of selected FCS technologies to BCTs, but recommended cancelling the MGCV component of the program. Secretary Gates was concerned that there were significant unanswered questions in the FCS vehicle design strategy and, despite some adjustments to the MGCVs, that they did not adequately reflect the lessons of counterinsurgency and close quarters combat in Iraq and Afghanistan. After reevaluating requirements, technology, and approach, DOD would then re-launch the Army's vehicle modernization program, including a competitive bidding process.

On June 23, 2009, DOD issued an acquisition decision memorandum that formally implemented Secretary Gates's FCS program decisions.¹⁴ This memorandum, inter alia, directed the Army to "spin out the initial increment of the FCS program to seven infantry brigades in the near term [E-IBCT program] and additional programs for information and communications networks, unmanned ground and air vehicles and sensors, and an integration effort aimed at follow-on spin outs to all Army Brigades."¹⁵ In addition, the acquisition decision memorandum reaffirmed the establishment of a new ground combat vehicle acquisition program in 2010.

GCV Program

The GCV Concept¹⁶

The Army's 2009 Modernization Strategy focused on quickly developing a new GCV in a technologically versatile approach. This approach, termed the Incremental Development Approach, features a modular design intended to accommodate vehicle growth in size, weight, power, and cooling requirements so that as technologies matured, they could be incorporated into new versions of the GCV with little or no modification to the basic vehicle.

The GCV concept, in short, is to

- field the GCV by 2015-2017;

¹² Daniel Wasserbly, "Testing Pushed Back to Next Summer: Army to Reprogram Funding in FY 08, FY 09 for FCS Spin Out 1 Changes," *InsideDefense.com*, June 30, 2008.

¹³ Information in this section is taken from a transcript of Secretary of Defense Robert M. Gates Budget Press Briefing, Arlington, VA, April 6, 2009.

¹⁴ Information in this section is taken from a DOD News Release, "Future Combat Systems (FCS) Program Transitions to Army Combat Brigade Team Modernization," No. 451-09, June 23, 2009.

¹⁵ Ibid.

¹⁶ Information in this section is from the Army Capabilities Integration Center, *The Ground Combat Vehicle Strategy: Optimizing for the Future*, October 2009, available at <http://www.g8.army.mil>.

- design the platform with sufficient margin for future capabilities;
- incorporate only mature technologies for vehicle integration;
- maintain a continuous armor development; and
- design the vehicle to accept current and future network capabilities (for example, radios, sensors, and jammers).¹⁷

Army leadership has indicated that the GCV could be either a tracked or wheeled vehicle. The Army has also suggested that it saw “a lot of value in common chassis in terms of logistics support,” and that it might pursue a common chassis for GCV variants.¹⁸ Other possible GCV features discussed by the Army included a V-shaped hull and side armor to protect against IEDs.¹⁹ The Army has also suggested that the new GCV would be fuel efficient.²⁰ The air transportability of the GCV has been discussed as a key design consideration, and the Army had said that the GCV must be able to fit on C-17 transports.²¹ In order for the GCV to be a “full spectrum” combat vehicle, the Army reportedly had required that non-lethal weapon systems be incorporated into vehicle design. While the GCV is to have some military equipment directed by the Army, such as radios and chemical protection systems, Army officials are leaving most of the specific solutions to industry recommendations.²²

The Initial GCV Request for Proposal (RFP)²³

On February 25, 2010, the Army released the RFP for the GCV as described in the following DOD press release:

Army Ground Combat Vehicle Request for Proposal Released²⁴

The Army released last Thursday a RFP for the technology development phase²⁵ of the Infantry Fighting Vehicle being developed under the GCV effort. The Army has worked extensively with the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics to develop this program. The GCV acquisition program will follow DOD best

¹⁷ Department of the Army, *2009 Army Modernization White Paper*, p. 5.

¹⁸ Emelie Rutherford, “Army Casting Wide Net for Post-FCS Vehicles Coming in Five to Seven Years,” *Defense Daily*, May 13, 2009.

¹⁹ Ibid.

²⁰ John T. Bennett, “Carter: FCS Successor Effort Could Have Many Primes,” *Defense News*, May 18, 2009.

²¹ Marjorie Censer and Kate Brannen, “Army Assessing Brigade Combat Modernization in Plan Due to OSD,” *InsideDefense.com*, May 18, 2009.

²² Daniel Wasserbly, “Testing Pushed Back to Next Summer: Army to Reprogram Funding in FY 08, FY 09 for FCS Spin Out 1 Changes,” *InsideDefense.com*, June 30, 2008.

²³ DOD defines Request for Proposal (RFP) as a solicitation used in negotiated acquisition to communicate government requirements to prospective contractor and to solicit proposals.

²⁴ DOD News Release, “Army Ground Combat Vehicle Request for Proposal Released,” No. 161-10, March, 2, 2010.

²⁵ From the November 2009 Defense Acquisition University Glossary of Defense Acquisition Acronyms & Terms, the Technology Development (TD) Phase is the second phase of the Defense Acquisition Management System and the purpose of this phase is to reduce technology risk and to determine the appropriate set of technologies to be integrated into the full system.

acquisition practices and be a competitive program with up to three contract awards. The GCV development effort will consist of three phases: technology development, engineering and manufacturing design and low rate initial production. The Army anticipates awarding the first contracts for the technology development phase in the fourth-quarter of fiscal 2010.

The technology development phase involves risk reduction, identification of technology demonstrations, competitive prototyping activities, and planned technical reviews. Industry will have 60 days to submit proposals to the Army for this development effort.

The Ground Combat Vehicle effort is part of a holistic Army plan to modernize its combat vehicle fleet. This includes incorporating Mine-Resistant Ambush Protected (MRAP) vehicles into the fleet while modernizing current vehicle fleets including Stryker. The first GCV will be an Infantry Fighting Vehicle offering a highly-survivable platform for delivering a nine-man infantry squad to the battlefield. The GCV is the first vehicle that will be designed from the ground up to operate in an IED environment. It is envisioned to have greater lethality and ballistic protection than a Bradley, greater IED and mine protection than an MRAP, and the cross country mobility of an Abrams tank. The GCV will be highly survivable, mobile and versatile, but the Army has not set specific requirements such as weight, instead allowing industry to propose the best solution to meet the requirements.

Prior to the release of the RFP, the Army engaged with industry through a series of industry days to inform them of the government's intent for GCV development and gain their feedback from potential contractors about GCV requirements and emerging performance specifications. In response to these initiatives the Army received significant feedback and insights on requirements, growth, training, test and the program at large thereby informing the requirements process and indicating the potential for a competitive contracting environment.

Preliminary GCV Criticisms

After the release of the RFP and subsequent program-related briefings and discussions, a number of criticisms emerged as analysts began to examine the GCV RFP and program in greater detail. These criticisms are categorized as follows:

Programmatic

In order to avoid past criticisms of events outpacing relevancy and decades-long acquisition programs, Army leadership stipulated that the first GCVs would be delivered seven years after the program was initiated. While this decision was relatively well-received, in order to achieve this ambitious timeline, modifications to the traditional acquisition process were required. One criticism was that the Army chose to issue the RFP prior to the completion of the Analysis of Alternatives²⁶ phase of the defense acquisition process.²⁷ In response to this criticism, DOD and

²⁶ From the November 2009 Defense Acquisition University Glossary of Defense Acquisition Acronyms & Terms, The Analysis of Alternatives (AoA) is defined as follows: "The AoA assesses potential materiel solutions to satisfy the capability need documented in the approved Initial Capabilities Document (ICD). It focuses on identification and analysis of alternatives, measures of effectiveness (MOEs), cost, schedule, concepts of operations, and overall risk, including the sensitivity of each alternative to possible changes in key assumptions or variables. The AoA is normally conducted during the Materiel Solution Analysis (MSA) phase of the Defense Acquisition Management System (DAMS), is a key input to the Capability Development Document (CDD), and supports the materiel solution decision at Milestone A."

²⁷ Unless otherwise noted, information in this section is taken from Kate Brannen, "Army Launches Ground Combat (continued...)"

Army officials maintained that running the Analysis of Alternatives phase during the RFP phase would give the Army more time to consider industry's proposals and evaluate alternatives to a new vehicle. Traditionally, the Analysis of Alternatives occurs before an RFP is initiated. Another concern is that the Army chose to use a cost-plus and not a fixed price contract during the Technology Development phase of the program. The Administration is said to favor fixed price contracts as critics of cost-plus contracts say that they "invite abuse because they allow companies to charge the government costs plus a fixed profit, no matter how poor their performance."²⁸ The Army, on the other hand, defended its use of cost-plus contracts during the technology phase as it allowed for more innovation and risk-taking.²⁹ Reports suggest that Army officials involved in the GCV program are having difficulty agreeing on performance requirements and how they should be prioritized.³⁰ The use of cost-plus contracts as well as constantly changing requirements were both points of contention in the FCS program.

Vehicle Weight

The Army has made soldier survivability the most important performance requirement for the GCV. Because the Army has also left it up to industry to determine the GCV design, there are no specific vehicle weight constraints. In May 2010, senior Army leaders reportedly stated that estimates at that time projected that the GCV could weigh up to 70 tons, making it the world's heaviest infantry fighting vehicle.³¹ The Chief of Staff of the Army, General George Casey has remarked that he believes that the GCV must be much lighter, noting that "soldiers who have served in Iraq and Afghanistan have told him that big, heavy vehicles just aren't practical in urban combat" and that the Army "stopped using tanks and Bradleys on the streets of Baghdad just because of the size."³² One expert suggests that "given what transports, supply lines, and bridges in developing countries can bear, an optimal weight for a vehicle in an irregular warfare environment is 40 to 45 tons."³³ A counterargument contends that the irregular warfare environment has become so lethal that only 70 ton vehicles can survive.³⁴ In addition to operational considerations, a 70 ton GCV weight would also have an impact on how the vehicle is transported by air and by sea and, therefore, how quickly it could be deployed in the event of a conflict.

Reliance on Immature Technologies

Some critics noted that the initial GCV RFP contained provisions that the GCV would have requirements for a hit-avoidance system³⁵ as well as an active protection system³⁶ that were

(...continued)

Vehicle Contest," *Army Times*, February 26, 2010. For additional information on the defense acquisition process see CRS Report RL34026, *Defense Acquisitions: How DOD Acquires Weapon Systems and Recent Efforts to Reform the Process*, by Moshe Schwartz.

²⁸ Ross Colvin, "Obama Takes Aim at Costly U.S. Defense Contracts," *Reuters*, March 4, 2009.

²⁹ Kate Brannen, "Army Launches Ground Combat Vehicle Contest," *Army Times*, February 26, 2010.

³⁰ John T. Bennett, "U.S. Army Delays Ground Combat Vehicle," *DefenseNews.com*, August 25, 2010.

³¹ Matthew Cox, "U.S. Army Chief Casey: Make GCV Lighter," *Defense News*, June 14, 2010, p. 16.

³² Sydney J. Freedberg, Jr., "Army Tries Again for a New Tank," *National Journal*, August 7, 2010.

³³ *Ibid.*

³⁴ *Ibid.*

³⁵ A hit avoidance system is intended to use a variety of sensors and information technology to detect the presence of (continued...)

problematic developmental sub-systems of the cancelled FCS MGCV program.³⁷ Critics of these programs maintained that by employing these systems on armored fighting vehicles, the Army was sacrificing armored crew protection for an over-reliance on technologically questionable systems. The Army noted that if these systems could be developed, it would result in lighter, more fuel-efficient vehicles. Another criticism of these systems was that they would drive up the per-vehicle cost—an important factor when the Army is considering buying at least a thousand or more GCVs in its initial procurement.

The GCV—An FCS Redux?

Given these criticisms, some observers questioned if the Army's "new" GCV program was merely a continuation of the cancelled MGCV program and also suggested that the Army had learned little from the FCS program cancellation.³⁸ The Army's position on these assertions was that, whenever practical, they would incorporate proven FCS technologies in the GCV program as a means of saving money and to facilitate the rapid development of the GCV.

Potential GCV Vendors³⁹

In response to the Army's February 2010 RFP, three industry teams submitted technology development proposals to the Army. The first team included BAE Systems and Northrop Grumman; the second consisted of General Dynamics, Lockheed Martin, Raytheon, and MTU Detroit Diesel; and the third team, SAIC, Boeing, and the German firms of Krauss-Maffei Wegmann (KMW), and Rheinmetall Defence. All three teams also had a number of other firms as part of their teams. The BAE Systems-led team design was an original design, with the team claiming that its design would exceed the survivability of the MRAP and would have enhanced mobility capabilities to allow it to operate in both urban and cross country environments. The General Dynamics team provided no details on its technical approach but stated that its chosen design focused on soldier survivability and operational effectiveness and would incorporate mature technologies. The SAIC-led team stated that its design would be based on the German tracked Puma IFV that was developed based on lessons learned from Iraq and Afghanistan. SAIC also emphasized that all work, including production, would take place in the United States.

Army Cancels the RFP

When the Army released the RFP for the GCV Technology Development (TD) phase in February 2010, it anticipated awarding the first TD phase contracts in the fourth quarter of FY2010.⁴⁰ On

(...continued)

mines, IEDs, and enemy forces so that these threats can be avoided.

³⁶ An active protection system is a vehicle-mounted system which is intended to first detect incoming enemy anti-tank or anti-vehicle missiles and/or grenades and then engage and destroy these threats by means of a kinetic device.

³⁷ Sebastian Sprenger and Tony Bertuca, "Some Officials See FCS's Long Shadow in Army's Move to Revisit GCV," *InsideDefense.com*, August 31, 2010.

³⁸ Ibid.

³⁹ Information in this section is taken from Defence Professionals, "Three Competing Teams to Submit Proposal for Technology Development Phase," *defpro.com*, May 26, 2010.

⁴⁰ Department of Defense (DOD) Press Release, "Army Ground Combat Vehicle Request for Proposal Released," March 2, 2010.

August 25, 2010, while the Army was reportedly in the process of selecting the winners of the TD RFP, the Army's new Assistant Secretary of the Army for Acquisition, Logistics and Technology [ASA(ALT)], Malcolm O'Neil, cancelled the RFP in order to provide more time for technology integration as well to insure that the Army would use mature technologies in order to develop the GCV within the established seven year time frame.⁴¹ The Army reportedly planned to reissue the RFP within 60 days of the cancellation.⁴² It is expected that the original industry teams will submit new proposals and it is possible that other companies might also submit proposals.

Why the RFP Was Cancelled

The Army, in conjunction with the Pentagon's acquisition office, conducted a review of the GCV program in order "review GCV core elements including acquisition strategy, vehicle capabilities, operational needs, program schedule, cost performance, and technological specifications."⁴³ This review found that the GCV had too many performance requirements and too many capabilities to make it affordable⁴⁴ and relied on too many immature technologies. In response, the Army pledged that the new GCV RFP would "dial back the number of capabilities the new system must have—as well as significantly reworking the acquisition strategy by focusing on early technology maturity and setting firm cost targets."⁴⁵ In particular the Army reportedly planned to set a \$10 million per vehicle cost limit in response to reports that initial estimates projected that the GCV would cost more than \$20 million per vehicle. The Army reportedly had planned to issue a new RFP in late October 2010, suggesting even though the program has been delayed about six months, that the seven year GCV development goal is still achievable.

Revised GCV RFP Issued

On November 30, 2010, the Army issued a revised GCV RFP.⁴⁶ Under this proposal, industry will have until January 21, 2011, to submit proposals and the proposed vehicle can be tracked or wheeled. The Army has included affordability targets of per unit cost for the vehicle between \$9 and \$10.5 million and an operational sustainment cost of \$200 per operational mile, with both affordability targets being in FY2010 dollars. In addition, the Army will require that the GCV fit on a C-17 transport but not on a C-130. The Army expects to award its technology development contract to three contractors by April 2011 and the Technology Development (TD) Phase is planned to last 24 months. An early prototype vehicle is expected by the middle of FY2014 and the first full-up prototype is expected by the beginning of FY2016. The Army has initially

⁴¹ Kate Brannen, "Interview: Malcolm O'Neil, Acquisition Executive, U.S. Army," *Defense News*, September 6, 2010, p. 22; and Daniel Wasserbly, "U.S. Army Amends Approach to GCV Programme," *Jane's Defence Weekly*, September 1, 2010, p. 9.

⁴² Daniel Wasserbly, "U.S. Army Amends Approach to GCV Programme," *Jane's Defence Weekly*, September 1, 2010, p. 9.

⁴³ Roxana Trion, "Army to Re-Start Bidding Process for New \$40B Ground Combat Vehicle Program," *The Hill*, August 25, 2010.

⁴⁴ Kate Brannen, "Ground Combat Vehicle Delayed; Effort Called Too Ambitious," *Army Times*, September 6, 2010.

⁴⁵ Jason Sherman, "Army to Mandate Technology Maturity Levels, \$10 Million Price Target for GCV," *InsideDefense.com*, September 16, 2010.

⁴⁶ Unless otherwise noted, information in this section is taken from C. Todd Lopez, "Army Issues RFP for Ground Combat Vehicle," *Army News Service*, December 2, 2010.

planned for 1,874 GCVs with the first production vehicle rolling off the assembly line in early April 2018 and the first unit should be equipped with GCVs in 2019.

The new RFP is a fixed price incentive fee contract versus the cost-plus fixed fee contract of the previous RFP.⁴⁷ The new contract has a ceiling of \$450 million per contractor for the TD Phase. An incentive fee would split 80% to the government if the cost comes in under the negotiated \$450 million ceiling cap, with 20% going to the contractor. If the cost comes in over the cap, the contractor assumes 100% of the additional cost.

Defense Industry Concerns with the Revised RFP⁴⁸

Reports suggest that the defense industry has a number of concerns with the revised RFP. According to one report “industry still doesn’t get what the Army is looking for,”⁴⁹ suggesting that many of the technical specifications that the contractors expected the Army to spell out were left open-ended and that industry would have to propose many of the vehicle’s technologies and features. Another concern was that industry was not clear on how many vehicles the Army intended to build and questioned whether the Army could afford the production in the long run. According to the Army, the GCV is intended to replace infantry fighting vehicles in heavy brigade combat teams (HBCTs), which would be 50% of the Bradleys in the HBCT. Some analysts suggest that the GCV’s \$10 million price tag per vehicle could make it vulnerable to future budget cuts, with one analyst noting that the \$10 million cost was so high that “the program is sure to be politically controversial and therefore suffer much the same fate the Marine Corps Expeditionary Fighting Vehicle has.”⁵⁰

Because of concerns that the GCV program will not make it to production, issues regarding sustaining the industrial base have been raised. Analysts contend that there are very few new combat vehicles currently in production, noting that Bradley A3 production ends in 2012; the last Stryker armored personnel carrier in 2013; and the M-1 Abrams tank remanufacturing program comes to an end after 2014, leaving the improved Paladin self-propelled howitzer in production until the GCV starts production in 2017. Defense industry analysts are concerned that with so few opportunities to develop and manufacture armored fighting vehicles, that some long-standing U.S. defense firms might drop out of the business, thereby limiting bidding on any future armored fighting vehicle programs to foreign manufacturers.

⁴⁷ Information in this section is taken from Ann Roosevelt, “New Ground Combat Vehicle RFP Offers Affordability Targets,” *Defense Daily*, December 1, 2010.

⁴⁸ Information in this section is taken from Kate Brannen, “U.S. Army: Budgets Allow \$9 – 10.5 Million GCV,” *Defense News*, December 13, 2010; and Grace V. Jean, “Army’s Ground Combat Vehicle Stirs Confusion in Industry,” *National Defense*, January 2011 edition.

⁴⁹ Kate Brannen, “U.S. Army: Budgets Allow \$9 – 10.5 Million GCV.” Ibid.

⁵⁰ Ibid. For additional information on the Expeditionary Fighting Vehicle see CRS Report RS22947, *The Marines’ Expeditionary Fighting Vehicle (EFV): Background and Issues for Congress*, by Andrew Feickert.

The E-IBCT Program

The E-IBCT Concept

The E-IBCT Program is part of the Army's Brigade Combat Team (BCT) Modernization Program and is essentially a continuation of the FCS Program's spin out efforts to provide network technology, sensors, and unmanned aerial and ground vehicles to Army units. According to the Army,⁵¹ the E-IBCT program is the first increment of the Army's long-term BCT Modernization Program and, beginning in 2011, the following systems are planned to be delivered to nine as opposed to the original seven IBCTs:

- Urban and Tactical Unattended Ground Sensors (U/T-UGS);
- Class I (Block 0) Unmanned Aerial System (UAS);
- Small Unmanned Ground Vehicle (SUGV) Block 1; and
- Network Integration Kit (NIK) mounted on HMMWVs and MRAPs to enable data sharing and command and control (C2) of all systems.

These systems are the same systems included in the first FCS spin out, less the Non-Line of Sight Launch System (NLOS-LS) which was cancelled in May 2010 because DOD determined that it would "not provide a cost-effective precision-fire capability" as the system's missiles were estimated to cost about \$316,000 apiece.⁵² Prior to the NLOS-LS cancellation, GAO valued the cost of Increment One for nine BCTs at about \$3.5 billion.⁵³ Under the current E-IBCT program each brigade would be fielded 81 Network Integration Kits (NIKs), 29 sets of Urban Unattended Ground Sensors, 13 sets of Tactical Unattended Ground Sensors, 23 Class 1 Unmanned Aircraft Systems, and 38 Small Unmanned Ground Vehicles.⁵⁴

Prime Contractors⁵⁵

The E-IBCT prime contractors include the following:

- Prime: The Boeing Company, Integrated Defense Systems, St. Louis, Missouri.
- Class I UAS: Honeywell, Aerospace Division, Albuquerque, New Mexico.
- NLOS-LS: Raytheon Missile Systems, Tucson, Arizona (*program cancelled*).
- UGS: Textron Defense Systems, Wilmington, Massachusetts.

⁵¹ Information in this section is taken from the Army's Fact Sheet "Modernizing the Army's Brigade Combat Team Increment 1 Capabilities," September 13, 2010.

⁵² Sebastian Sprenger, Tony Bertuca, Debbie Siegelbaum, "Army Breaks Up Remnants of Post-FCS Suite, Girds for New Contract Plan," *InsideDefense.com*, May 17, 2010.

⁵³ GAO Testimony Before the Subcommittee on Airland, Committee on Armed Services, U.S. Senate, "Defense Acquisitions: Opportunities and Challenges for Army Ground Force Modernization Efforts," April 15, 2010.

⁵⁴ Kate Brannen, "U.S. Army to Weigh Buying More FCS Gear," *Defense News*, November 18, 2010.

⁵⁵ From the Army's 2009 Program Book, January 2009, p. 65.

- SUGV: iRobot, Burlington, Massachusetts.

Boeing's role as prime contractor is to integrate all of the other systems and manage the E-IBCT process. There is no prime contractor for the NIK however, because it consists of a suite of computers, radios, and sensors from different vendors.

Testing and Reliability Problems

From August to September of 2009, a Limited Users Test (LUT) of the E-IBCT systems was conducted at Ft. Bliss, TX by the Army Evaluation Task Force (AETF)—an Army unit that had previously been formed to test FCS technologies. This test was the first operational test of E-IBCT systems and involved four 96-hour test scenarios. The Army's intent at that time was to begin low-rate initial production of these Increment One systems after the LUT so that fielding could start in the FY2011-2012 timeframe. The results of the LUT, however, revealed pervasive performance and reliability shortcomings for all Increment One systems. The Pentagon's Director of Operational Test and Evaluation (DOT&E) reported that, *inter alia*:⁵⁶

- **Urban Unattended Ground Sensors**—Demonstrated a mean time between system aborts (MTBSA)⁵⁷ of 25 hours vs. a 105 hour requirement. The system developer had predicted a MTBSA of 4,187 hours.
- **Tactical Unattended Ground Sensors**—Demonstrated a MTBSA of 52 hours vs. a 127 hour requirement. The system developer had predicted a MTBSA of 1,258 hours.
- **Class I Block 0 Unmanned Aerial System**—Demonstrated a MTBSA of 1.5 hours versus a 23 hour requirement.
- **Small Unmanned Ground Vehicle Block 1**—Demonstrated a 5.2 hour MTBSA versus a 42 hour requirement.
- **Network Integration Kit**—Demonstrated a 33 hour MTBSA versus a 112 hour requirement. The system developer had predicted a MTBSA of 1,615 hours.
- **Non Line of Sight Launch System** (cancelled by the Army in May 2010)—Two of six missiles fired achieved target hits; four missed their targets with two of those missiles impacting 14 or more kilometers short of the target.

Given these findings, as well as difficulties with E-IBCT systems operating at expected ranges and delivering less than satisfactory results, the Director of Operational Test and Evaluation concluded that the “reliability desired for E-IBCT Increment One systems is not achievable without an extensive design-for reliability effort.”⁵⁸ Given these findings, the Army—with

⁵⁶ Memorandum For Principal Deputy Under Secretary of Defense (Acquisition, Technology and Logistics), Subject: State of Reliability, June 30, 2010.

⁵⁷ The November 2009 Defense Acquisition University Glossary of Defense Acquisition Acronyms & Terms defines MTSA as the statistical mean time or mileage between system aborts of systems in a new or like-new condition. A system abort is an incident that, due to its severity, would cause a system not to start a mission, to be withdrawn from a mission, or be unable to complete a mission. System aborts give rise to essential unscheduled maintenance activities intended to correct the failure.

⁵⁸ Memorandum For Principal Deputy Under Secretary of Defense (Acquisition, Technology and Logistics), Subject: State of Reliability, June 30, 2010.

significant pressure from DOD and Congress—concluded that Increment One was not ready to be fielded and agreed to an extensive redesign effort and to conduct a subsequent LUT in the fall of 2010.

Fall 2010 LUT—Mixed Results Reported

In September 2010, the Army started its second Increment One LUT at Ft. Bliss under the scrutiny of the Pentagon and GAO. Results have not yet been made public, but preliminary indications are that while some improvement has been made, that some of the systems tested might not have performed well enough and, based on their cost, might not be fielded to units as originally planned.⁵⁹ Reports suggest that the NIKs are still affected by “lengthy wait times for start-up and data transfer” with some suggesting that because the NIK plays such a central role in the network and the joint tactical radio system, that it might be “too important to terminate.”⁶⁰ In addition, the utility of the unattended ground sensors and the continued high cost of the Class I UAV are also of continued concern.⁶¹ In addition, it was recently reported that DOT&E has concluded that only the SUGV is “operationally suitable” and that the other systems are not ready to be fielded.⁶² If the decision to not field most Increment One systems is made by the Army, the need for the current E-IBCT program might be questioned. With possibly only one system emerging from the LUT process, it might be easier and less expensive to field this system to units on an individual programmatic basis as opposed to the current Boeing-led effort.

Defense Acquisition Board Review⁶³

According to reports, a December 2010 Defense Acquisition Board Review for the first E-IBCT capabilities package was to have been held. A Defense Acquisition Board Review is important as it reviews the status of the program and its readiness to proceed into the next phase of the acquisition cycle and also makes recommendations on cost-schedule-performance trade-offs to senior decision makers. If approval is granted, the Army plans to award a number of contracts to begin production. On December 23, 2010, it was reported that the Defense Acquisition Board Review would be postponed until mid-January 2011 due to “scheduling difficulties.”

⁵⁹ CRS discussion with the Army, November 1, 2010.

⁶⁰ Tony Bertuca, “NIK Too Big to Fail?: Army Eyes E-IBCT Utility and Affordability, Preps for December DAB,” *InsideDefense.com*, November 29, 2010.

⁶¹ Ibid.

⁶² Jason Sherman, “On Eve of Major Review, Top DOD Tester Finds E-IBCT Not Operationally Suitable” *InsideDefense.com*, December 10, 2010.

⁶³ Kate Brannen, “Jury Still Out on the Usefulness of U.S. Army’s FCS Gear,” *Defense News*, November 1, 2010, p. 16 and Tony Bertuca, “Early Infantry Brigade Combat Team DAB Review Postponed Until Mid-January,” *InsideDefense.com*, December 23, 2010.

FY2011 Budget Request

GCV

The FY2011 Budget Request for the GCV was \$934.3 million for Research, Technology Development and Evaluation (RDT&E).⁶⁴ These funds are intended for technology development (TD)-associated activities resulting in a preliminary design for the GCV.

E-IBCT

The FY2011 Budget Request for the E-IBCT was \$682.7 million for Procurement and \$1.6 billion for RDT&E.⁶⁵ Procurement funding is intended to buy capability packages to enhance two IBCTs to be fielded in FY2012. The RDT&E request is to continue support and testing for the Increment One and development of Increment Two. These increments will provide additional capabilities and advances in networking and battle command to the remaining IBCTs.

FY2011 Legislative Activity

GCV

House Armed Services Committee (HASC)⁶⁶

The HASC was supportive of the GCV program and recommended fully funding the \$934.3 million request but had a number of concerns. One concern was that the Committee believed that some of the GCV requirements were extremely ambitious, citing poorly thought-through requirements for the FCS MGCV as a reason that the MGCV was cancelled. The HASC was concerned that the Army was once again asking the defense industry to build a “gold plated” vehicle that could take longer to develop than planned and prove very expensive to procure. The Committee also expressed concern that the Army had released the GCV RFP eight months before an Analysis of Alternatives was completed, suggesting that the Army was conducting a pro forma exercise that would have little bearing on the award of the initial TD contracts.

As a result, the HASC urged the Army to take two actions. First, the Army should carefully review requirements and adopt a more incremental approach that separates “needs” from “wants.” While the HASC supported the survivability requirement, it was concerned that other requirements would prove to be too complex and too costly, such as incorporating non-lethal weapons, the active protection system, and aggressive fuel efficiency requirements. The second recommended action was that the Army should conduct a thorough Analysis of Alternatives

⁶⁴ The Army Budget Request - Fiscal Year 2011 Executive Summary, February 1, 2010, p. 24.

⁶⁵ Ibid., p. 7.

⁶⁶ Report of the Committee on Armed Services House of Representatives, National Defense Authorization Act for Fiscal Year 2011, Report 111-491, May 21, 2010, pp. 139-141.

before proceeding to the technology development phase. The HASC believed that the Army should fully evaluate if current vehicles - including foreign-designed vehicles—could be upgraded to meet baseline GCV requirements, therefore getting these vehicles to troops quicker than the current seven year timeline.

Senate Armed Services Committee (SASC)⁶⁷

The SASC recommended full funding (\$934.4 million) for continued development of the GCV.

House Committee on Appropriations Defense Subcommittee

The Defense Subcommittee completed its markup of the FY2011 Defense Appropriations Bill but did not release a report nor introduce the bill.

Senate Committee on Appropriations Defense Subcommittee⁶⁸

The Subcommittee noted with concern that the GCV was projected to cost approximately \$23 million per vehicle but commended the Army's decision to revise the acquisition strategy including the six month contract award delay. As a result, the committee provided \$462.1 million, as requested by the Army, to fully fund the revised program.

The Subcommittee noted its continued concern about the GCV program's overall affordability as well as the wisdom of initiating the GCV program, which will impact only a limited part of the Army's force structure, while the Army's overall vehicle modernization program remains in flux. The Subcommittee, noting that the Army failed to provide a justification for its FY2011 combat vehicle modernization request, expects the Army to address these issues in its FY2012 budget request.

E-IBCT

House Armed Services Committee (HASC)⁶⁹

The HASC provided recommendations for a number of E-IBCT sub-programs as discussed in the following sections:

- **Network Integration Kits (NIK):** Citing the results of the 2009 LUT, the HASC expressed numerous concerns with the cost and performance of the NIK. The committee, noting the NIK's poor performance when tested with a very small unsecured network, doubted that it would be able to perform any better with a

⁶⁷ Press Release: U.S. Senate Committee on Armed Services, "Senate Armed Services Committee Completes Markup of National Defense Authorization Act for Fiscal Year 2011," May 28, 2010, p. 18.

⁶⁸ Senate Report No. 111-295, Department of Defense Appropriations Bill, 2011 to Accompany S. 3800, September 16, 2010, p. 143-144.

⁶⁹ Report of the Committee on Armed Services House of Representatives, National Defense Authorization Act for Fiscal Year 2011, Report 111-491, May 21, 2010, pp. 52-53.

full, secure network. In addition, it noted that the NIK would provide only marginal improvement over current networking arrangements and, at a cost of \$1 million per vehicle, it was difficult to justify funding this system. Noting that the Army had been provided funding in FY2010 to outfit two IBCTs with NIKs, the HASC recommended no procurement funding in FY2011 for NIKs—a \$176.6 million decrease.

- **Small Unmanned Ground Vehicle Block 1 (SUGV):** The HASC noted that despite six years of system development, that the SUGV performed poorly during the 2009 LUT. The Committee also noted that the Army already had funding for the first two IBCT sets of SUGVs but recommended adding \$1.3 million to the Army's original \$20.1 million SUGV budget request.
- **E-IBCT Training/Logistics/Management:** The HASC noted that the requested funds were for the fielding of other E-IBCT equipment and that because of reductions in other E-IBCT procurement funds, the committee did not feel that these funds were necessary. The HASC therefore recommended no funding—a decrease of \$61.6 million.
- **Urban and Tactical Unattended Ground Sensors (U-UGS and T-UGS):** The Committee noted that despite six years of development, the sensors performed poorly during the 2009 LUT and in addition to reliability problems, they contributed little to unit situational awareness. The HASC also noted that sufficient funds had already been provided to the Army for sensors and therefore recommended no funding—a decrease of \$29.7 million in procurement funding.

These and other recommended cuts resulted in \$152.7 million in RDT&E reductions and \$626.7 million in procurement funding reductions from the FY2011 E-IBCT Increment One budget request.

Senate Armed Services Committee (SASC)⁷⁰

The SASC recommended \$302.4 million in procurement funding for E-IBCT Increment One technologies and network development.

House Committee on Appropriations Defense Subcommittee

The Defense Subcommittee completed its markup of the FY2011 Defense Appropriations Bill but did not release a report nor introduce the bill.

Senate Committee on Appropriations Defense Subcommittee⁷¹

The Subcommittee recommended reductions of \$2 million for the Class One Unmanned Aerial System and a \$12 million reduction for E-IBCT Training/Logistics/Management.

⁷⁰ Press Release: U.S. Senate Committee on Armed Services, "Senate Armed Services Committee Completes Markup of National Defense Authorization Act for Fiscal Year 2011," May 28, 2010, p. 18.

⁷¹ Senate Report No. 111-295, National Defense Appropriations Bill, 2011 to Accompany S. 3800, September 16, 2010, p. 54-74.

P.L. 111-383, FY2011 National Defense Authorization Act

Because the Senate did not consider H.R. 5136, The National Defense Authorization Act for Fiscal Year 2011, under the normal legislative process, the Senate reached an agreement with the House and H.R. 6523, The National Defense Authorization Act for Fiscal Year 2011 was passed by the House on December 17, 2010, and by the Senate on December 22, 2010. H.R. 6523, P.L. 111-383 was signed by the President on January 7, 2011 and contains the following provisions for the GCV and E-IBCT Program.⁷²

GCV

P.L. 111-383 fully funds the Administration's adjusted request of \$461 million for the GCV and includes a provision that requires DOD to provide Congress the complete Analysis of Alternatives study that was conducted prior to the request for proposals in December 2010.

E-IBCT

According to Congress:

The E-IBCT program continues to demonstrate sub-par performance across the board. The only independent test data available from September 2009 showed that all E-IBCT items had serious shortfalls, and not a single item met reliability requirements. In April of this year, the Army terminated the costly non-line-of-sight launch system (NLOS-LS), one of the last remaining EIBCT components. Additionally, the Army still has unobligated funds provided by Congress for E-IBCT in FY08, FY09, and FY10 that will sufficiently cover any program costs should the Army chose to pull out components of E-IBCT and field them separately to meet theater demands.⁷³

Potential Issues for Congress

How Will Future Force Structure Decisions Influence These Programs?

The Army currently plans that by 2012, 15 of 45 Active Component (AC) BCTs and 8 of 28 Army National Guard (ANG) BCTs will be Heavy BCTs (HBCTs).⁷⁴ GCVs are intended to replace the M-2 Bradley IFVs in HBCTs. There are, however, two major force structure-related issues that could have significant implications for the numbers and types of GCVs to be purchased as well as how many sets of E-IBCT equipment will be fielded. The first issue is that the Army is reportedly considering returning to a division-based structure that it abandoned six years ago in favor of a brigade-centric structure.⁷⁵ As a result of the decision to move to the BCT-

⁷² Information in the following sections is taken from a HASC Report on H.R. 6523, National Defense Authorization Act for Fiscal Year 2011, December 22, 2010.

⁷³ HASC Report on H.R. 6523, National Defense Authorization Act for Fiscal Year 2011, December 22, 2010.

⁷⁴ Army Campaign Plan 2011 (1st Draft), September 15, 2010, p. A-6 and A-7.

⁷⁵ Sandra Irwin, "Army Vice Chief Gen. Chiarelli: Programs Will be Terminated," *National Defense*, September 22, 2010 and Sebastian Sprenger, "Questions Linger About the Army's Brigade-Centered Organization," (continued...)

centric organization, equipment and vehicle requirements soared, making the BCTs expensive to maintain and, in some cases, there was not enough equipment and too few vehicles to outfit the brigades.⁷⁶ Examining the performance of the BCTs in Iraq and Afghanistan, Army experts noted that the fundamental modularity assumption that units could be “assigned, attached, and detached without weakening these units’ cohesiveness and effectiveness has been proven false.”⁷⁷ In addition, the Army is said to be considering adding a third maneuver battalion to HBCTs and IBCTs which could also have significant force structure ramifications.⁷⁸

The second issue is that on January 6, 2011, Secretary Gates announced that he planned to reduce the Army’s permanent active-duty endstrength by 27,000 soldiers.⁷⁹ While his announcement did not address cuts to specific Army units, it is possible that a number of combat units that would receive GCVs and E-IBCT systems might be eliminated.

These possible actions have implications for both programs. The Army could conceivably change the number of HBCTs as well as their organization which could have a significant impact on the numbers of GCVs procured and total program costs. In addition, HBCTs might be assigned new roles and missions, also impacting GCV numbers and possibly required capabilities. The same can be said for the overall requirements for E-IBCT equipment if IBCT numbers and roles and missions vary significantly. In lieu of these potential changes to Army force structure, it can be argued that the GCV and E-IBCT programs should proceed at a more measured and introspective pace until the Army can resolve these significant organizational and capabilities issues.

Are There Viable Alternatives?

Both the GCV and E-IBCT programs could prove to be technologically infeasible or too costly for the Army to procure. If either of these become the case, the Army would likely look for alternatives to these programs. In terms of the GCV, modernizing the current Bradley IFV is probably the most viable alternative. If the Army continues to have a requirement for a tracked IFV, the Bradley Modernization Plan which recapitalizes⁸⁰ the A2 and A3 variants, could prove to be the cheapest alternative. The Army’s FY2011 Budget Request notes that the Bradley recapitalization total program cost is estimated to be \$10.49 billion.⁸¹ The Army notes that the A3 version, in particular, is:

Not only more lethal, survivable, sustainable but provides enhanced command and control, improved situational awareness and enemy/friendly force location. The Bradley A3 will

(...continued)

InsideDefense.com, October 26, 2010.

⁷⁶ Ibid.

⁷⁷ Sebastian Sprenger, “Questions Linger About the Army’s Brigade-Centered Organization,” *InsideDefense.com*, October 26, 2010.

⁷⁸ CRS discussion with Army officials, November 1, 2010.

⁷⁹ U.S. Department of Defense News Transcript, DOD News Briefing with Secretary Gates and Adm. Mullen from the Pentagon, January 6, 2011.

⁸⁰ The Army defines recapitalization as restoring existing equipment to like new conditions with zero miles/hours.

⁸¹ Army FY2011 Budget Justification Sheet, Bradley Program (M2A3) (G80717), February 2010.

maintain combat overmatch over current and future threat forces and complements the M1A2 Abrams System Enhancement Program tank.⁸²

One benefit of this alternative is that it makes use of a combat-proven vehicle that could see limited use in counterinsurgency and counterterror operations that many defense experts believe could characterize future U.S. military operations. In addition, if the Army decides to reduce the number of HBCTs, there could be surplus Bradleys available for the Army to recapitalize. If the Army does find itself facing a conventional enemy armor force, the M-2A3 Bradley “will enjoy overmatch over current and future threat forces.” While still a heavy and large vehicle, the Bradley can be transported by current U.S. military airlift assets. One potential problem is that Bradleys - largely due to flat undersides - have proven vulnerable to IEDs and modifications to address this problem could prove to be both technologically infeasible and costly. Another possible concern is that Bradleys, even if extensively recapitalized, might not be able to accommodate the various Army command, control, and information systems, as well as links to unmanned systems that the Army is currently investing in for the future.

If the E-IBCT program can overcome its reliability and operational effectiveness issues, the high cost of some of its components might compel the Army to seek alternatives. Of primary concern to many are the radios and the NIK. Reports suggest that the ground-mobile joint tactical radios are currently priced at approximately \$250,000 a piece and the hand-held radios from \$20,000 to \$75,000.⁸³ Of greater concern to many is the estimated cost of \$1 million a piece for the NIKs which are needed to connect vehicles to the network.⁸⁴ If these costs prove prohibitive, the Army might be forced to seek alternative solutions. One possible solution could be to modify existing radios such as the current Single Channel Ground and Airborne Radio System (SINCGARS) radio for E-IBCT use. While these radios might not have all of the functionality of the joint tactical radios under development, they might provide enough capability at a substantially reduced price to make them a viable alternative. Another possible course of action could be to field the entire E-IBCT suite, less any of the subprograms that do not pass the second LUT, to a limited number of units instead of all IBCTs and rotate the equipment to IBCTs that are deploying. One potential downside to this alternative is that with the equipment in almost constant use, it could wear out or be destroyed at an accelerated rate, thereby requiring replacement and additional incurred costs. In addition, if reliability problems can not be solved, an alternative to the current program arrangement where Boeing is responsible for testing, training, and fielding of increment systems might prove to be more cost-effective. It was reported that in early December 2010, that Boeing was awarded a \$37 million dollar contract to support future E-IBCT testing, training, software and fielding efforts⁸⁵ and if the SUGV is the only Increment One system that is going to be fielded to IBCTs, then some might question the need for the current Boeing-led effort.

⁸² Ibid.

⁸³ Sandra I. Erwin, “In Damage Control Mode, Army Builds Future Network for Combat Brigades,” *National Defense*, July 2010 and “Army Under Pressure to Bring Broadband to the Battlefield,” *National Defense*, September 2010.

⁸⁴ Kate Brannen, “House Panel Whacks U.S. Army Modernization Effort,” *DefenseNews*, May 12, 2010.

⁸⁵ Tony Bertuca, “Boeing Begins Delivering E-IBCT Hardware to Army as DAB Draws Near,” *InsideDefense.com*, December 13, 2010.

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